Conditional Interim Certification Findings

NJDEP Stormwater Management Technology Project Management Team (PMT)

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Treatment Technology

Vortechs® Stormwater Treatment System by Vortechnics, Inc.

Applicant Information:

Vortechnics, Inc.
200 Enterprise Drive
Scarborough, ME 04074
www.vortechnics.com

Technology Description

The Vortechs® Stormwater Treatment System is a hydrodynamic separator designed to enhance gravitational separation of floating and settling materials from stormwater flows. Stormwater flows enter the unit tangentially to the grit chamber, which promotes a gentle swirling motion. As stormwater circles the grit chamber, pollutants migrate toward the center of the unit where velocities are the lowest. The majority of solids that settle are left behind as stormwater exits the grit chamber via two apertures on the perimeter of the chamber. Next, buoyant debris, oil and grease are separated from water as it flows under the baffle wall. Stormwater then exits the system through the flow control wall and ultimately through the outlet pipe.

New Jersey Corporation for Advanced Technology (NJCAT) Verified Claim

The Vortechs® System sized at a treatment operating rate of no more than 40 gpm/ft^2, with an average influent Total Suspended Solids (TSS) concentration of 187 mg/l and zero initial sediment loading, has been shown to have a TSS removal efficiency of 64% (per NJDEP treatment efficiency calculation methodology) for coarse silt particles (ranging from 38-75 microns) in laboratory studies using simulated stormwater.

Technology Limitations/Concerns

- TSS resuspension and washout could occur at high operating rates. This was not addressed by the lab tests as they were conducted with zero initial sediment loads.

- The Vortechs® Stormwater Treatment System, based on tested particle size distribution (38-75 microns), should be utilized where TSS is primarily composed of fine sand/coarse silt.
- Backwater conditions could potentially occur at high flow rates due to system outlet design and if downstream hydraulic calculations are not performed properly.
- The Vortechs® Stormwater Treatment System design incorporates standing water in the separation chamber and containment sump, which can potentially be a breeding site for mosquitoes. Vortechnics sells an optional manhole cover insert that allows outgassing, but prevents mosquitoes from entering the system through the manhole covers. Note that insert was not verified by NJCAT as the claim was solely focused on TSS removal efficiency based on lab tests.
- Lack of maintenance may cause the system to operate at a reduced efficiency and eventually fill with sediment.
- Inspections of accumulated pollutants should be performed on a quarterly basis or as recommended by the manufacturer. Inspections may need to be conducted more frequently in the winter where sanding operations may lead to rapid accumulations or sites with heavy sediment loads.

Conditions for NJDEP Conditional Interim Certification

According to NJCAT's verification report, the Vortechs® System sized at a treatment operating rate of no more than 40 gpm/ft^2, with an average influent TSS concentration of 187 mg/L and zero initial sediment loading, has been shown to have a TSS removal efficiency of 64% for coarse silt particles ranging from 38-75 microns. However, NJDEP downgraded the TSS removal efficiency from 64% to 50% since 1) the particle size distribution utilized for the laboratory tests was less conservative than the recommended particle size distribution, and 2) the system was not tested with an initial sediment load as recommended. Calculated peak flow is based on NJ's water quality design storm as recommended in the most current NJ's Stormwater Best Management Practices Manual, and the operating rate is defined as the design peak flow rate divided by the Grit Chamber Area. In addition to the downgrading of the TSS removal efficiency to 50%, the following conditions will apply to the conditional interim certification:

1. The Vortechs® System should be the first component, if used as part of a treatment train (i.e. utilized in front of best management practices methods such as detention, retention, and infiltration basins, as defined in the NJ Stormwater Best Management Practices Manual).
2. The Vortechs® System shall be designed in accordance with New Jersey's water quality design storm, as required in the Stormwater Management Rules (N.J.A.C. 7:8).
3. A Quality Assurance Project Plan supporting the Technology Acceptance and Reciprocity Partnership (TARP) Tier II Protocol for Stormwater Best Management Practice Demonstration (July, 2003) shall be submitted to NJDEP and/or NJCAT within six (6) months from the date of this Conditional Interim Certification letter.
4. Field evaluation data that is consistent with the Tier II Protocol shall be submitted to NJDEP and/or NJCAT by August 31, 2006.